Direct access to relational databases (R16)

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INTREPID can directly access relational databases for both reading and writing. It can access range of database formats including *Oracle*, *Postgress*, *SQL Server*, *Microsoft Access*. As currently shipped, INTREPID only supports *Oracle*. To arrange access to other databases, contact our technical support service.

INTREPID uses a JDBC link to connect to the database. It treats each relational database table as a separate INTREPID dataset.

Apart from modifying the data itself, INTREPID does not change the configuration of the relational database. It records information about the database in a **.jdbc** file that represents the connection and contains information about it and the data.

INTREPID establishes the connectivity protocol and provides metadata in **.jdbc** files. These replace the **.isi** files in the relational context.

.jdbc files

A **.jdbc** file contains:

- URL
- Table names
- Uaer name and password
- Any special requirements of SQL
- Metadata

For example, in an *Oracle* database

```
Connection Begin
    Driver  = oracle.jdbc.driver.OracleDriver
    Url = jdbc:oracle:thin:@top5:1521:DATA
    Password = tiger
    Username = scott
    Schema  = SCOTT
    UNIQUEknownas   = UNIQUE
    MetaData Begin
        Name   = SUBBART
        fid Begin
            Alias   = Fiducial
        fid End
        LINE Begin
            GroupBy = yes
            Alias   = LineNumber
        LINE End
        DLONG Begin
            Minimum =  0.000000000000
            Maximum =  178.747073
            Mean    =  134.924525
            Variance = 192.827556
            Samples = 2104285
            Nulls   = 6795
            Alias  = X
        DLONG End
        MetaData End
Connection End
```

For vector datasets, the extra metadata that INTREPID needs to carry for databases is in the **.jdbc** file. This includes statistics and aliases.

The **.jdbc** file contains the following information:

Statement or block	Description
Driver	Name of jdbc driver for your database. For normal use of Oracle databases under INTREPID, the driver is **oracle.jdbc.driver.OracleDriver**
URL	URL for your database. For *Oracle* the URL is **jdbc:oracle:thin:@*servername*:1521:*databasename*** Where: ***servername*** is the server name you specified when connecting ***databasename*** is the database name you specified when connecting See the table in Setting up access to an Oracle database
Username	Username as specified when connecting (see the table in Setting up access to an Oracle database).
Password	Password as specified when connecting (see the table in Setting up access to an Oracle database).
Schema	Schema as specified when connecting (see the table in Setting up access to an Oracle database).
UNIQUEknownas	SQL keyword for 'Select unique' statements in your database. This is usually **UNIQUE** or **DISTINCT**
MetaData Begin – End	The **.jdbc** file contains a **MetaData Begin – End** block for each database table that you access. It contains the same information as the **.isi** file for a single INTREPID dataset. INTREPID only creates the block when you access the table. See "INTREPID standard information (.isi) files" in INTREPID database, file and data structures (R05)

Driver and URL settings for other databases

The JDBC driver that you use for a database requires a URL. The syntax varies for different suppliers. You can get this information from the supplier's website or look at the distributed examples in the ***install_path*/sample_data/examples** directory (where ***install_path*** is the location of your INTREPID installation).

The last three sections in the URL are ***server*:*port*:*databasename***

Oracle

The last three items in the **URL =** statement are *server:port:databasename*. For example, **@top5:1521:DATA**. See the full example above.

Postgress

The following example is for *Postgress*, a freeware relational database on *Linux*.

```
Driver  =  org.postgresql.Driver
Url     = jdbc:postgresql://scully:5432/des
```

Example of URL if the database is on your local machine:

```
Url     = jdbc:postgresql:des
```

MySQL

The following is for mySQL, a freeware relational database on *Linux*.

```
Driver  = com.mysql.jdbc.Driver
```

To connect to the database, you need to use a JDBC url with the following format

[xxx] denotes optional url components:

```
jdbc:mysql: //[hostname][,failoverhost...][:port][dbname]
[?param1=value1][&param2=value2]...
```

For example

```
Url = jdbc:mysql://192.168.200.63:3306/intrepid
```

Example of URL if the database is on your local machine:

```
Url = jdbc:mysql:des
```

Microsoft Access

The following is an example for *Microsoft Access*

```
Driver  = sun.jdbc.odbc.JdbcOdbcDriver
Url     = jdbc:odbc:SIMPLE1
UNIQUEknownas   = DISTINCT
```

In general, this would only work on your local machine.

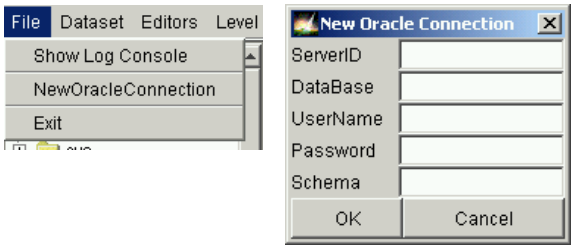
Setting up access to an *Oracle* database

>> To set up access to an Oracle database

1 Ensure that you have an installed version of *Oracle* and that the *Oracle* database is available on your network.

2 Go to the INTREPID Project Manager

3 Choose **New Oracle Connection** from the **File menu**. INTREPID displays the **New Oracle Connection** dialog box.



4 Specify parameters as shown in the following table.

Parameter	Instructions
ServerID	The name of the computer that hosts the *Oracle* database. For example, **`top5`**
Database	The database name (within *Oracle*, this is the SID). For example, **`data25`**
User	Enter your username for the database. If there is no username, *Oracle* usually allows **`scott`**
Password	Enter your password for the database. If there is no password, *Oracle* usually allows **`tiger`**
Schema	Enter the Oracle database schema you want to use. If there is no schema or you do not specify a schema, INTREPID sets your username as the schema. If you leave the schema blank initially you can see all of the tables. Examples of schemas are **`GRAVITY`** or **`ORACLE`** or **`SCOTT`**. The schema must be in upper case for INTREPID v3.7.

5 Click OK to save a connection file. This will create a file with the extension **`.jdbc`**, in the current directory.

6 Double click on this file in the INTREPID Project Manager Directories box and the list of available tables should appear.

7 Each table will correspond to a separate INTREPID dataset.

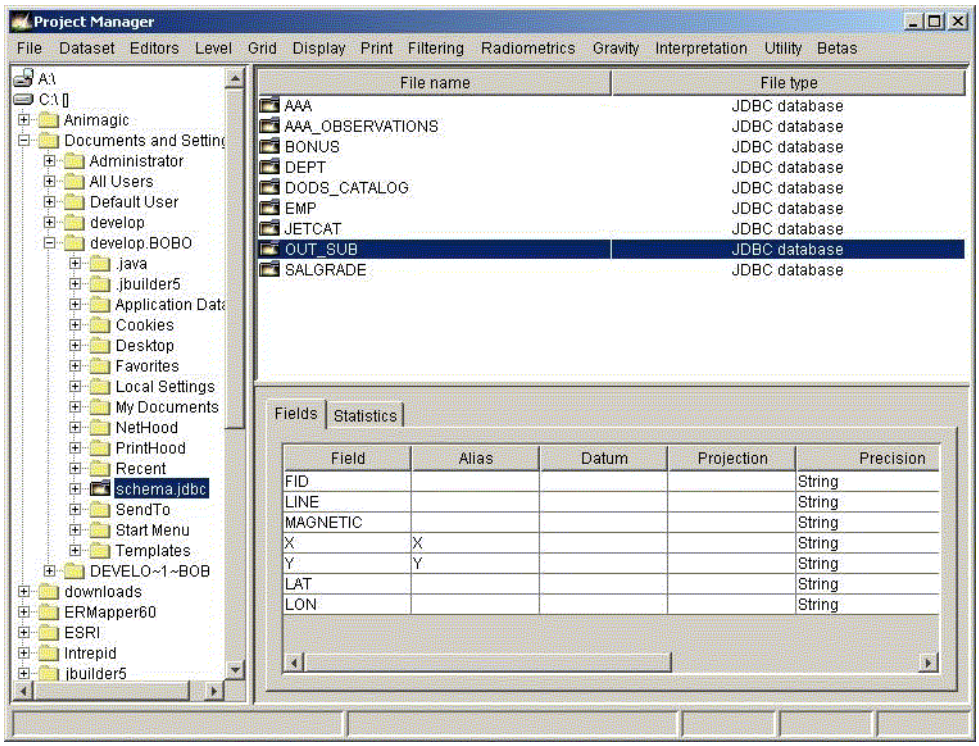
Accessing tables in an Oracle database

Project Manager (Java) access

When you have established a connection to an *Oracle* database, you can view its tables using the java Project Manager.

If you select a **`.jdbc`** file in the Project Manager, a list of tables appears in the file list. You can select a table as an INTREPID dataset and:

- Examine the table properties ising the Properties tabs in the Project Manager.
- Launch INTREPID tools with this table as the input dataset.

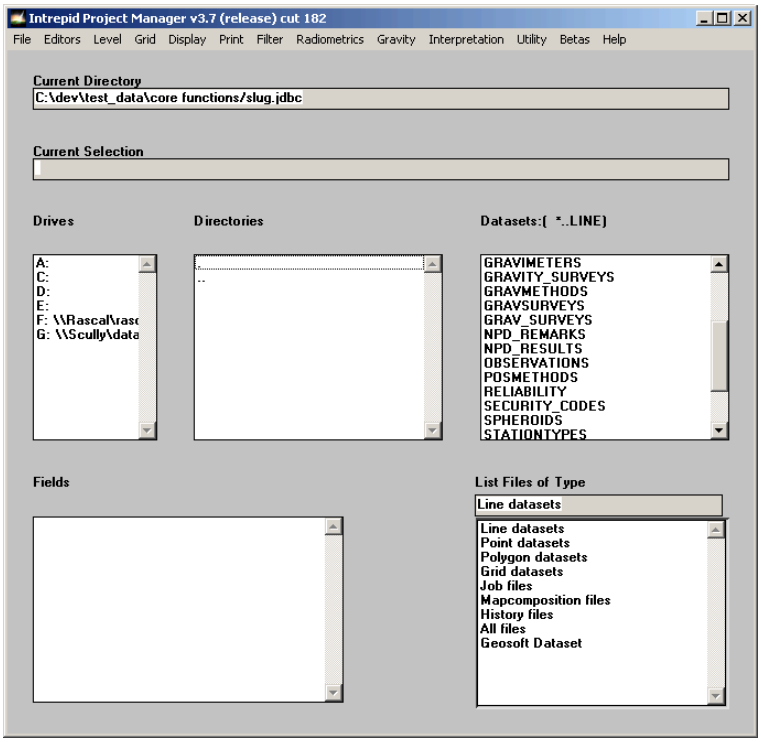


Project Manager (old) access

When you have established a connection to an *Oracle* database, you can view its tables using the Project Manager.

If you select a **`.jdbc`** file in the Project Manager, a list of tables appears in the file list. You can select a table as an INTREPID dataset and:

- Examine the fileds using the Fields area in the Project Manager.
- Launch INTREPID tools with this table as the input dataset.

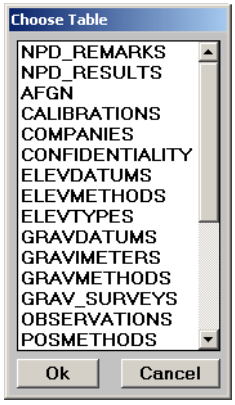


Specifying input datasets in INTREPID tools

>> To specify an Oracle database table as an input dataset to an INTREPID tool

1 Launch the INTREPID tool.

2 Specify the **`.jdbc`** file as an input dataset. INTREPID displays a dialog box with a list of tables in the *Oracle* database.



3 Select the table you require and click **OK** or **Open**.

Example `.jdbc` files

Example 1

This example is of a freshly created new connection. INTREPID has not accessed any tables from the database and so has not created any **`MetaData Begin – End`** blocks.

```
Connection Begin
  Driver  = oracle.jdbc.driver.OracleDriver
  Url  = jdbc:oracle:thin:@top5:1521:DATA
  Password  = tiger
  Username  = scott
  Schema  = SCOTT
  UNIQUEknownas  = UNIQUE
Connection End
```

Example 2

In this example, INTREPID has

- Accessed a table called **SUBBART** from the database
- Identified fields **FID** and **LINE**
- Established **LINE** as a 'group by' field
- Assigned **Fiducial** and **LineNumber** aliases

```
Connection Begin
      Driver  = oracle.jdbc.driver.OracleDriver
      Url     = jdbc:oracle:thin:@top5:1521:DATA
      Password        = tiger
      Username        = scott
      Schema  = SCOTT
      UNIQUEknownas   = UNIQUE
      MetaData Begin
            Name   = SUBBART
            FID Begin
                  Alias   = Fiducial
            FID End
            LINE Begin
                  GroupBy = yes
                  Alias   = LineNumber
            LINE End
       MetaData End
Connection End
```

Example 3

In this example, INTREPID has

- Accessed a table called **out_sub** from the database
- Identified fields **FID**, **LINE**, **X**, **Y**, **LAT**, **LON**
- Established **LINE** as a 'group by' field
- Identified fields **X**, **Y**, **LAT**, **LON** as location fields and identified their datum and projection
- Assigned **Fiducial** and **LineNumber** aliases to **FID**, **LINE**
- Assigned **X** and **Y** aliases to **X** and **Y**, identifying them as the 'official' location fields for the table

```
Connection Begin
      Driver= oracle.jdbc.driver.OracleDriver
      Url   = jdbc:oracle:thin:@top5:1521:DATA
      Password= tiger
      Username= scott
      Schema= SCOTT
      UNIQUEknownas= UNIQUE
      MetaData Begin
            Name  = out_sub
            Version= 177
            FID Begin
                  Alias = Fiducial
            FID End
            LINE Begin
                  GroupBy= yes
                  Alias = LineNumber
            LINE End
            X Begin
                  Projection= "TMAMG50"
                  Datum = "GDA94"
                  Alias = X
            X End
            Y Begin
                  Projection= "TMAMG50"
                  Datum = "GDA94"
                  Alias = Y
            Y End
            LAT Begin
                  Projection= "GEODETIC"
                  Datum = "GDA94"
            LAT End
            LON Begin
                  Projection= "GEODETIC"
                  Datum = "GDA94"
            LON End
      MetaData End
Connection End
```

Example 4

In this example, INTREPID has

- Accessed tables called **XYZ4**, **OUT_SUB**, **AAA**, **AAA_OBSERVATIONS** from the database
- Identified fields, 'group by' fields, aliases, location fields, datums, projections
- Calculated statistics for some fields

```
Connection Begin
      Driver= oracle.jdbc.driver.OracleDriver
      Url   = jdbc:oracle:thin:@top5:1521:DATA
      Password= tiger
      Username= scott
      Schema= SCOTT
      UNIQUEknownas= UNIQUE
      MetaData Begin
            Name  = XYZ4
            fid Begin
                  Alias = Fiducial
                  Minimum= 2884901889.000000
                  Maximum= 9999999999.000000
                  Mean  = 0.000000000000
                  Variance= 0.000000000000
                  Samples= 0
            fid End
            LINE Begin
                  GroupBy= yes
                  Alias = LineNumber
                  Minimum= 2884901889.000000
                  Maximum= 9999999999.000000
                  Mean  = 0.000000000000
                  Variance= 0.000000000000
                  Samples= 0
            LINE End
            X Begin
                  Projection= "TMAMG50"
                  Datum = "AGD66"
                  Alias = X
                  Minimum= 2884901889.000000
                  Maximum= 9999999999.000000
                  Mean  = 0.000000000000
                  Variance= 0.000000000000
                  Samples= 0
            X End
```

```
            Y Begin
                  Projection= "TMAMG50"
                  Datum = "AGD66"
                  Alias = Y
                  Minimum= 2884901889.000000
                  Maximum= 9999999999.000000
                  Mean  = 0.000000000000
                  Variance= 0.000000000000
                  Samples= 0
            Y End
            lat Begin
                  Projection= "GEODETIC"
                  Datum = "AGD66"
                  Minimum= 2884901889.000000
                  Maximum= 9999999999.000000
                  Mean  = 0.000000000000
                  Variance= 0.000000000000
                  Samples= 0
            lat End
            lon Begin
                  Projection= "GEODETIC"
                  Datum = "AGD66"
                  Minimum= 2884901889.000000
                  Maximum= 9999999999.000000
                  Mean  = 0.000000000000
                  Variance= 0.000000000000
                  Samples= 0
            lon End
            Name  = XYZ4
            MAGNETIC Begin
                  Minimum= 2884901889.000000
                  Maximum= 9999999999.000000
                  Mean  = 0.000000000000
                  Variance= 0.000000000000
                  Samples= 0
            MAGNETIC End
      MetaData End
      MetaData Begin
            Name  = OUT_SUB
            FID Begin
                  Minimum= 1775.000000
                  Maximum= 72410.000000
                  Mean  = 32810.108470
                  Variance= 334072189.169815
                  Samples= 30285
                  Nulls = 4
            FID End
```

```
            LINE Begin
                  Minimum= 14651.000000
                  Maximum= 70060.000000
                  Mean  = 17684.976031
                  Variance= 140896185.318958
                  Samples= 30289
                  Nulls = 0
            LINE End
            MAGNETIC Begin
                  Minimum= 56457.800000
                  Maximum= 57732.000000
                  Mean  = 56724.629270
                  Variance= 30193.414418
                  Samples= 30280
                  Nulls = 9
            MAGNETIC End
            X Begin
                  Minimum= 280096.000000
                  Maximum= 295926.000000
                  Mean  = 288119.796989
                  Variance= 20943993.005377
                  Samples= 30289
                  Nulls = 0
                  Alias = X
            X End
            Y Begin
                  Alias = Y
            Y End
            LAT Begin
                  Minimum= -30.340000
                  Maximum= -30.180000
                  Mean  = -30.261922
                  Variance= 0.002121871145
                  Samples= 30289
                  Nulls = 0
            LAT End
            LON Begin
                  Minimum= 114.710000
                  Maximum= 114.880000
                  Mean  = 114.797671
                  Variance= 0.002266575870
                  Samples= 30289
                  Nulls = 0
            LON End
      MetaData End
```

```
            MetaData Begin
                  Name  = AAA
                  GRAVITY Begin
                        Minimum= -5665.210000
                        Maximum= 9829695.870000
                        Mean  = 0.000000000000
                        Variance= 0.000000000000
                        Samples= 0
                  GRAVITY End
            MetaData End
            MetaData Begin
                  Name  = AAA_OBSERVATIONS
                  LONGITUDE Begin
                        Minimum=  0.000000000000
                        Maximum=      178.750000
                        Mean  =  0.000000000000
                        Variance=  0.000000000000
                        Samples= 0
                  LONGITUDE End
            MetaData End
      Connection End
```

Task files

```
Process Begin
     ZIN   = ./demo.jdbc/XYZ4/MAGNETIC
     OutputImage= /data/connectivity/oracle/test
     XIN   = ./demo.jdbc/XYZ4/X
     YIN   = ./demo.jdbc/XYZ4/Y
     Name  = newgridding
     Parameters Begin
          Grid_Size= 100.0
          XGrid_Size= 0.0
          YGrid_Size= 0.0
          X_Origin= 0.0
          Y_Origin= 0.0
          LineOrientation= 90.0
          CurrentBand= 0
          NumberOfBands= 1
          OutputPrecision= IEEE4ByteReal
          Rotate_Lines= No
          InitialMethod Begin
               Mode  = BiSpline
               CellAssignmentStyle= Nearest
               Max_Search_Distance= 2000.0
               Min_Search_Distance= 0.0
          InitialMethod End
          ComponentMethod Begin
               Product= None
          ComponentMethod End
          TensorMethod Begin
               Product= MAX_Tensor
          TensorMethod End
          SplineType Begin
               Mode  = Akima
          SplineType End
          GridConditioning Begin
               Masking= No
               CrewCut= No
               Clipping= Yes
               Smoothing= No
               No_Internal_Nulls= No
               SmoothingIterations= 6
               LaplaceIterations= 2
               Cells2Extrapolate= 5
          GridConditioning End
          QualityControl Begin
               SaveTriangles= No
               SaveOriginalSamplePoints= No
               SaveCoarseGrids= No
               SaveOriginalValuesGrid= No
               SaveCurvatureGrid= No
          QualityControl End
     Parameters End
Process End
```